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Economic impact of McMaster University on the city of Hamilton & surrounding localities 1973

John A. Cleworth

Eliot C. Higbee

Stanley F. Semeniuk

Office of Institutional Research

McMaster University

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THE ECONOMIC IMPACT OF McMASTER UNIVERSITY ON THE CITY OF HAMILTON AND SURROUNDING LOCALITIES

SUMMARY

Early in the spring of 1973, the Office of Institutional Research at McMaster University was asked to conduct a study of McMaster's economic impact upon the localities surrounding the University. The intent of the study was to develop information that would provide a clearer insight into the economic effects--in terms of income and jobs--that result from McMaster's presence.

The study dealt with the short term economic impact of the University. Emphasis was placed on the commonsense aspects of this impact, especially the expenditures made by the University and the employment supported by it. The main body of the report excluded data on the McMaster University Medical Centre (MUMC) since disaggregated data were not available for the geographic areas being studied. However, summary data for MUMC are presented in this section in order to provide a complete picture of the University's impact.

The results of the study indicate that McMaster's faculty and staff spent $24,592,000 in the localities under consideration ($20,716,000 coming from the University and $3,876,000 from MUMC). Students added $11,788,000 and visitors spent $300,000. McMaster spent $40,404,000 for goods and services ($38,375,000 coming from the University and $2,029,000 from MUMC). These expenditures yielded a total direct cash flow into the localities under study of $77,084,000.

In addition, Mc Master directly supported 3823 jobs (3181 in the University and 642 in MUMC). Over 70% of these jobs were held by residents of Hamilton.

When the effects resulting from the personal expenditures of faculty, staff, students, and visitors were considered along with the jobs indirectly supported by McMaster's presence, the University stimulated a total income in the localities under study of $154,000,000 and supported approximately 7640 jobs.

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THE ECONOMIC IMPACT OF McMASTER UNIVERSITY ON THE CITY OF HAMILTON AND SURROUNDING LOCALITIES[1]

Introduction

What economic impact does McMaster University have on its surroundings? The study reported here was designed to answer that question. It was based on a common sense analysis of the major short-term economic impacts that McMaster has upon several communities near the University.

In a decade, McMaster has grown from a small school with a few economic roots in the Hamilton area to a major corporate enterprise that affects the economic fibre of Hamilton and surrounding communities. The University is one of the largest employers in the Hamilton area with an operating budget (excluding the McMaster University Medical Centre) of over $40 million. The economic impact of an industrial corporation of similar size is often quite visible. But the economic impact of a university, since it is a place of people and ideas not one of products and services, is often not visible or understood. This report was prepared to illuminate the relationships involved in that impact.

In 1971, the American Council on Education's Commission on Administrative Affairs published a handbook for college and university economic impact studies.[2] That handbook was the result of three year's research and field testing sponsored by a grant from the Esso Foundation. It set forth a detailed methodology by which colleges and universities, associated agencies, business and industry, and governments could assess the direct, short-term economic impact of post-secondary education institutions upon specific localities.

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[1]This study does not include the economic impact of the McMaster University Medical Centre (MUMC). Summary data for MUMC were included in the Summary on p.ii to give a complete overview of the University's economic impact.

[2]John Caffrey and Herbert H. Issacs, Estimating the Impact of a College or University on the Economy (Washington, D.C.: American Council on Education, 1971).

Although modifications have been made to the Caffrey-Issacs methodology in this study, the basic approach used here in consistent with the principles underlying their work. Therefore, this study should provide an insight into McMaster's economic impact that will enable the University and the persons, agencies, and organizations benefiting from the impact to better understand, evaluate, and affect the economic relationships described here.

Framework for the Study

The Model

A University's economic impact can be conceptualized at a number of different levels of detail. The Caffrey-Issacs volume describes several levels that have been used in college and university economic impact studies.[1] Figure 1 illustrates the conceptual framework underlying the study reported here. Note that the framework used for this study is basically a short-term, cash flow model. The model assumes that McMaster is a non-profit enterprise (i.e., income = expenditure). Therefore, the analyses that follow were based on expenditures by the University and their subsequent multiplier effects.[2]

This study included only that portion of the model enclosed by the dotted line for two reasons.[3] Firstly, the Caffrey-Issacs work demonstrated that a university's economic impact on local government can be quite small in comparison to its impact on businesses and individuals (of the order of 1/10th). Secondly, the areas around McMaster were in the process of changing their governmental structures--i.e., from local governments to regional governments. Thus, this aspect of the University's economic impact was deferred for a future study.

The model had several ramifications that were beyond the scope of this study. Long-range economic considerations were not treated. Since such considerations generally tend to increase the economic impact of an institution, the results of the study are conservative statements of the University's impact. Operating cash flows generate

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[1] Ibid., pp. 5-8.

[2] These effects are discussed in detail on pp. 15-17.

[3] Note that the study dealt with the University excluding McMaster University Medical Centre (MUMC).

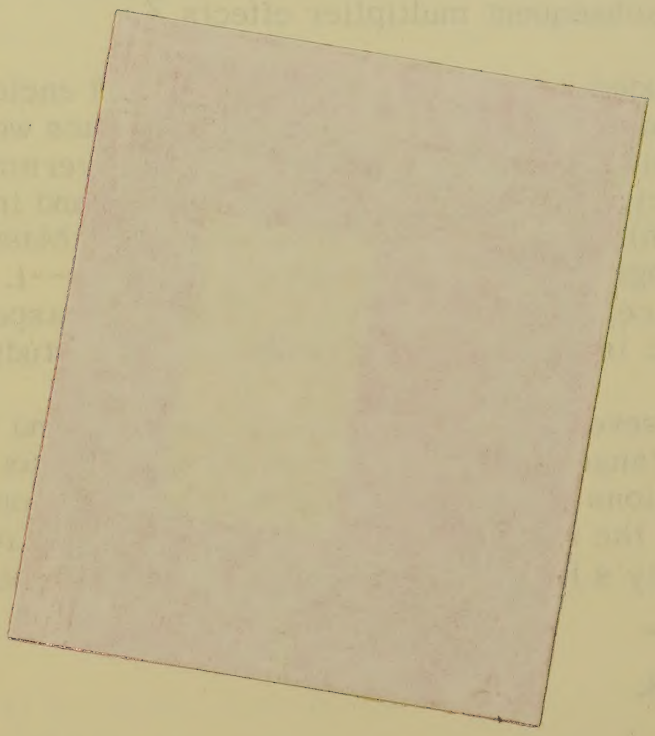
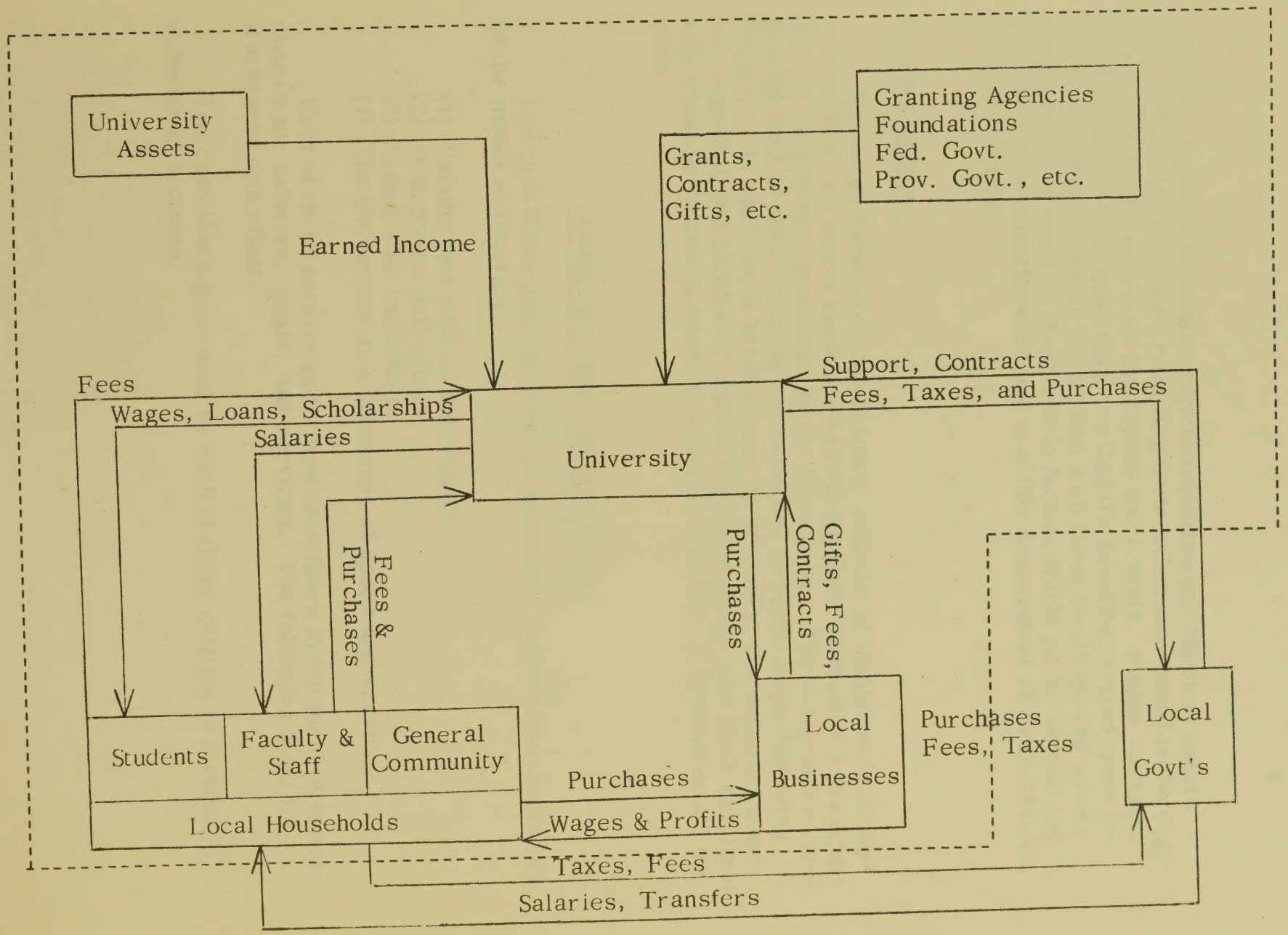


FIGURE 1: McMaster University: Short-Term Cash Flow Model



economic impacts on related capital facilities and physical assets: e.g., industrial expansion resulting from university-based technology, faculty and staff real estate purchases and rentals, student auto purchases, etc. While logic suggests that the benefits derived from increased business activity associated with these facilities and assets is beneficial, a study of these subtle factors would go far beyond the intentions of straightforward and credible assessment of more obvious economic effects.

Primary Aspects

The study focused on two primary aspects of McMaster's economic impact: (1) direct cash flows resulting from McMaster's presence and (2) employment generated by the University. The components comprising each of these aspects are examined in detail in the following sections. In addition, a brief section is devoted to the indirect economic benefit to the McMaster students living at home (and their families) who would be forced to attend university elsewhere if McMaster did not exist.

University-Related Cash Flows

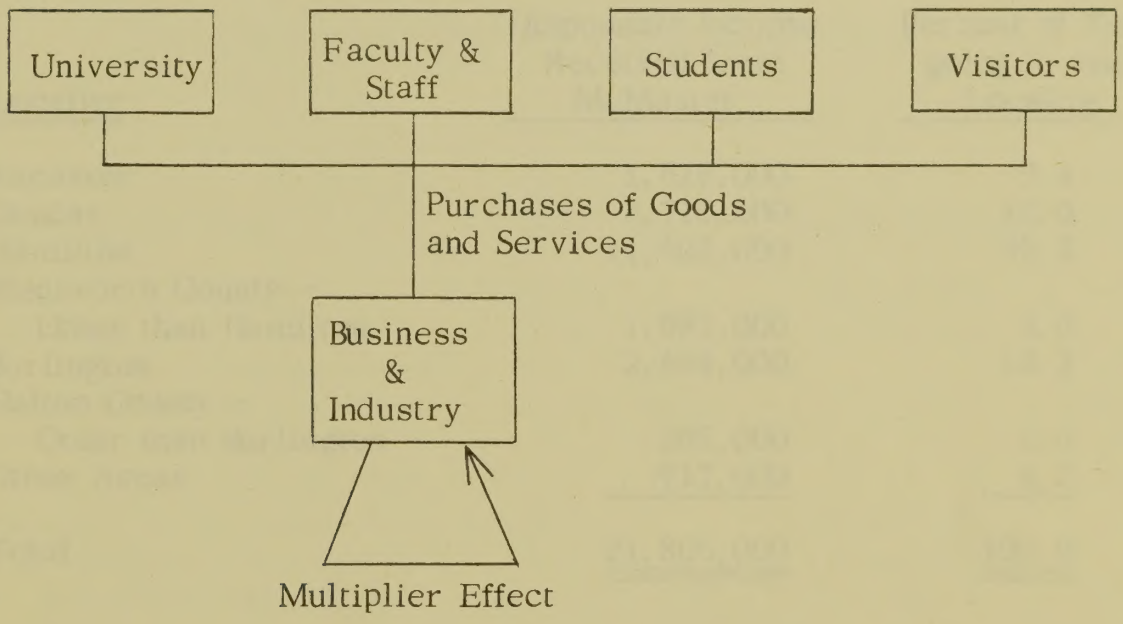
The cash flows generated by the university involve four segments of the model in Figure 1:

(1) Faculty and staff as individuals
(2) Students as individuals
(3) Visitors as individuals
(4) The University as a consumer of goods and services.

Each of these entities generates cash flows in the form of expenditures for salaries, goods, and services. The following diagram illustrates this effect.

The cash flows generated by each of these entities is treated in subsequent sections.

FIGURE 2: University Related Cash Flows



Direct Cash Flows: The First Round of Expenditures

Faculty and Staff Disposable Income

The first step in determining the cash flows generated by McMaster in Hamilton and surrounding localities was to examine the net disposable income from McMaster sources associated with faculty and staff. A measure of this disposable income was obtained from the University's Business Office for the 1972 calendar year classified by locality. [1] Table 1 shows the distribution of this disposable income.

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[1]Note that this study does not deal with a specific fiscal year but with the 1972 calendar year. Certain adjustments to the university's accounting records were necessary to obtain a consistent data set for the study.

TABLE 1:

Faculty and Staff Disposable Income by Locality of Residence

Locality	Disposable Income Received from McMaster	Percent of Total going to each Locality
Ancaster	1,619,000	7.4
Dundas	3,710,000	17.0
Hamilton	11,602,000	53.2
Wentworth County--		
Other than Hamilton	1,087,000	5.0
Burlington	2,664,000	12.2
Halton County--		
Other than Burlington	207,000	1.0
Other Areas	917,000	4.2
Total	21,806,000	100.0

An estimated distribution of faculty and staff expenditures by type of purchase was prepared. This estimate is based on the following assumptions:

(1) The "propensity to save" of faculty and staff is about 5%. Therefore, a total of .95 x $21,806,000 = 20,716,000 would actually be spent on the first round of expenditures. The balance of the total faculty and staff disposable income would stimulate banking, finance, and investment in the localities under consideration.

(2) Purchases are distributed by type according to typical patterns in the Hamilton area.[1]

Table 2 contains the results of this estimate.

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[1]Statistics Canada, Family Expenditure in Canada, Vol. III, Major Urban Centres, 1969 (Ottawa, Ontario: Information Canada, Catalogue No. 62-537, 1973), pg. 44.

TABLE 2:

Expected Annual Faculty and Staff Expenditures

Expenditure Item	% of Total Expenditure		Expected Annual Expenditure	
Food	22.7		4,702,000	
Shelter	22.0		4,557,000	
Rented Living Quarters		6.3		1,305,000
Owned Living Quarters		11.0		2,279,000
Other Housing		.9		186,000
Water, Power and Fuel		3.8		787,000
Household Operation	5.2		1,077,000	
Furnishings & Equipment	5.6		1,160,000	
Household Appliances		1.6		331,000
Other		4.0		829,000
Clothing	9.4		1,947,000	
Personal Care	3.0		621,000	
Medical & Health Care	3.9		808,000	
Smoking & Alcoholic Bevs.	4.4		911,000	
Travel & Transportation	16.3		3,377,000	
Automobile (and Truck)		13.6		2,818,000
Purchase		5.8		1,202,000
Operation		7.8		1,616,000
Other		2.7		559,000
Recreation	4.0		829,000	
Reading	.8		166,000	
Education	.9		188,000	
Miscellaneous Expenses	1.8		373,000	
TOTAL	100.0		20,716,000	

Student Expenditures[1]

The method used to determine student expenditures by locality can be summarized as follows:

(1) Data for the total number of students (broken down by undergraduate and graduate students) were obtained.

(2) These data were disaggregated according to the students' addresses with consideration given to whether the students were living at home, on campus, or away from home and off-campus.

(3) Estimates of average expenditures for each group of students were obtained.

(4) The number of students in each group was multiplied by their average expenditures to produce the results in Tables 3, 4, and 5.

Appendix A contains a breakdown of student expenditures for various groups of students. The assumption underlying this analysis is that if McMaster did not exist, students would go elsewhere to University.

Visitors' Expenditures[2]

Visitors from outside areas attend conferences at McMaster, especially during the summer. In 1972, approximately 12,000 such visitors came to McMaster. Their average length of stay was estimated at three days with an off-campus expenditure of $15. This estimate was conservative since some of these visitors stayed as long as ten weeks. In addition, approximately 3,000 other outside visitors attended events at McMaster that were not classified as conferences. An estimate was made of $25 per visit for off-campus food and lodging and $15 per visit for miscellaneous items. These expenditures produced a total off-campus expenditure of $300,000. All of this expenditure was assumed to occur in Hamilton.

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[1]The expenditures reported here exclude expenditures at University facilities (e.g., expenditures for textbooks, fees, etc.) in order to eliminate double counting later in the study--i.e., when the University as a consumer of goods and services is considered. The "propensity to save" of students is assumed to be nil.

[2]All estimates in this section were furnished by Mr. A. Glockling, Coordinator, Ancillary Services, McMaster University.

TABLE 3:

Undergraduate Student Expenditure by Locality of Student Residence[1]
(Eight-Month Academic Year)

Locality	No. of Students Living in Area	Student Expenditures
Ancaster	77	92,000
Dundas	239	287,000
Hamilton	5658	6,280,000
Wentworth County--		
Other than Hamilton	197	236,000
Burlington	351	421,000
Halton County--		
Other than Burlington	84	101,000
Other Areas	414	497,000
TOTAL	7020	7,914,000

TABLE 4:

Graduate Student Expenditures by Locality of Student Residence[2]
(Twelve-Month Academic Year)

Locality	No. of Students Living in Area	Student Expenditures
Ancaster	11	27,000
Dundas	87	294,000
Hamilton	902	3,049,000
Wentworth County--		
Other than Hamilton	31	105,000
Burlington	23	78,000
Halton County--		
Other than Burlington	8	27,000
Other Areas	87	294,000
TOTAL	1149	3,874,000

[1]Based on the residence survey referenced in Appendix A. All undergraduate students outside Hamilton were treated as living at home. Within Hamilton, 30% were treated as living in residence at McMaster, 40% as living at home, and 30% as living away from home and off-campus.

[2]Note that graduate studies at McMaster extend over the full calendar year, and therefore residence in the several localities is on a year-round basis.

TABLE 5:

Total Student Expenditures by Locality of Student Residence

Locality	Student Expenditures
Ancaster	119,000
Dundas	581,000
Hamilton	9,329,000
Wentworth County-- Other than Hamilton	341,000
Burlington	499,000
Halton County-- Other than Burlington	128,000
Other Areas	791,000
Total	11,788,000

University Expenditures for Operating and Capital Goods and Services

The University regularly purchases goods and services from a broad range of suppliers. In order to determine the distribution of these purchases by locality, payments to suppliers were summarized by vendor address for the 1972 calendar year. A direct summary of all university purchases would involve double counting since faculty and staff spend a small amount of their expendable income at the university--e.g., in parking fees, etc. (All faculty and staff net income has been treated as expendable income in the localities under consideration earlier in the study). This problem was eliminated by subtracting from the University's purchases for goods and services that portion attributable to faculty and staff expenditures at University facilities. [1]

The results of this process are presented in Table 6. This summary represents only the first round of expenditures. The impact of subsequent rounds of expenditures--i.e., the expenditures for salaries

[1]Note that the treatment of student expenditures did not include any monies paid to the University. Thus, double counting was eliminated from student expenditures.

goods, and services, made by McMaster's suppliers, etc.--is treated in a subsequent section. The following section summarizes the total direct cash flows associated with McMaster's presence.

TABLE 6:

McMaster University: Non-Salary Operating and Capital Expenditures[1]

Locality	% of Total Going To Locality	Expenditure in Locality
Ancaster	.1	54,000
Dundas	2.3	883,000
Hamilton	51.2	19,658,000
Wentworth County-- Other than Hamilton	.3	111,000
Burlington	2.4	921,000
Halton County-- Other than Burlington	.4	132,000
Other Areas	43.3	16,616,000
Total	100.0	38,375,000

Total Direct Cash Flows

The discussion in conjunction with Figures 1 and 2 indicated that McMaster affects cash flows through four University-related elements:

(1) Faculty and Staff
(2) Students
(3) Visitors
(4) University purchases of capital and operating goods and services.

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[1]Table 6 includes only payments made in Canadian funds. Since less than 4% of McMaster's expenditures were in non-Canadian funds, the limitations introduced by using only Canadian expenditure data were small. Expenditures are net after adjustments to avoid double counting of $1,111,000 due to purchases by faculty and staff at McMaster. McMaster's total unadjusted expenditure for capital and operating goods and services was $39,486,000.

The cash flows associated with each of these elements were presented by geographic locality.

In this section, the cash flows from these four elements are summed to give a total direct cash flow and source of income resulting from McMaster's presence. In previous sections, seven geographical areas (Ancaster, Dundas, etc.) were used. In this section, three areas are used: Wentworth County including Hamilton, Halton County including Burlington, and other outside areas.

Two major factors necessitated this regrouping. Firstly, some expenditures by individuals living in small communities--especially for durable goods--are made in larger urban centres rather than in their home town. Thus, the assumption that persons living in Halton County outside Burlington spend all their net expendable income in their community of residence would be unwarranted. By using the three groupings mentioned here, inaccuracies caused by such shifting of purchases toward urban centres were minimized. Secondly, the direct cash flows summarized here provide the basis for the multiplier effect discussed in the next section. This effect involves subsequent expenditure rounds. On these rounds, transfers between geographical areas are even more likely than they are on the first round. For example, a construction firm having a Hamilton address may employ persons from Binbrook, Dundas, etc. Therefore, while the first round of expenditures can be treated as accruing to Hamilton, the second round cannot.

Table 7 summarizes the total direct cash flows for these three areas. Figure 3 represents this same information graphically. Because of the phenomenon of cash flow shifts toward large urban centres, over 60% of the University total direct expenditures can be considered as accruing to Hamilton.

Employment Generated by the University[1]

The University supports employment both directly and indirectly. Table 8 lists by locality the number of employees supported directly by the University during the period under study--i.e., the number of persons employed at McMaster.

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[1] Excluding employment at the McMaster University Medical Centre (MUMC). Data are from the University Personnel System and the Office of Institutional Research.

TABLE 7:

Total Direct Cash Flows (Expenditures) by Area Resulting from McMaster's Presence[1]

Locality	0.95 x Table 1	Table 5	Table 6	Total Expenditures	Regrouping	Area
Ancaster	1,538,000	119,000	54,000	1,711,000	48,494,000	Wentworth County
Dundas	3,525,000	581,000	883,000	4,989,000		
Hamilton	11,022,000	9,629,000[2]	19,658,000	40,309,000		
Wentworth County	1,033,000	341,000	111,000	1,485,000		
Burlington	2,531,000	499,000	921,000	3,951,000	4,407,000	Halton County
Halton County	196,000	128,000	132,000	456,000		
Other Areas	871,000	791,000	16,616,000	18,278,000	18,278,000	Other Areas
Total	20,716,000	12,088,000	38,375,000	71,179,000	71,179,000	

[1]Total expenditures were based on the assumption that faculty and staff spend 95% of their net disposable income as in Table 2. Therefore, total direct cash flows (TDCF) were derived as follows: TDCF = .95 (faculty and staff expendable income) + total student expenditures + visitors' expenditures + University non-salary capital and operating expenditures.

[2]Includes $300,000 visitors' expenditures.

FIGURE 3:

Distribution of Total Direct Cash Flows (Expenditures) by Area Resulting from McMaster's Presence

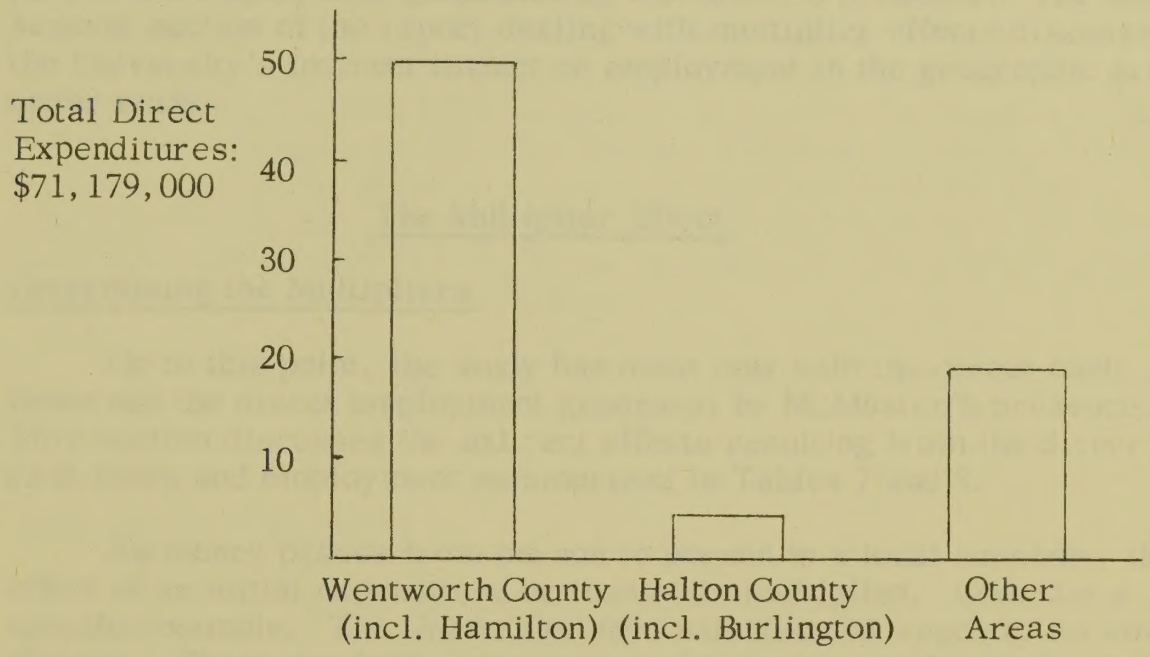

TABLE 8:

Employment at McMaster by Locality of Employee Residence

Locality	Full-Time Academic Employees	Full-Time Non-Acad. Employees	FTE Part-Time Employees[1]	Total No. of Employees
Ancaster	78	67		
Dundas	170	252		
Hamilton	473	1357		
Wentworth County-- excl. Hamilton	34	79		
Total Wentworth	755	1755	175	2685
Burlington	130	161		
Halton County-- excl. Burlington	9	18		
Total Halton	139	179	22	340
Other Outside Areas	52	94	10	156
Total	946	2028	207	3181

[1]The FTE of part-time employees was determined by dividing the total wages paid to part-time employees of $1,496,000 by an average salary of $7,220 (the average for full-time employees). This yielded a total of 207 jobs. These jobs were distributed in proportion to the distribution of full-time jobs.

The number of jobs supported directly by the University is only part of the employment generated by McMaster's presence. The subsequent section of the report dealing with multiplier effects discusses the University's indirect impact on employment in the geographic areas under study.

The Multiplier Effect

Determining the Multipliers

Up to this point, the study has dealt only with the direct cash flows and the direct employment generated by McMaster's presence. This section discusses the indirect effects resulting from the direct cash flows and employment summarized in Tables 7 and 8.

As money passes from person to person in a local economy, the effect of an initial expenditure or income is multiplied. Consider a specific example. The University pays salaries and wages to its employees. These employees spend part of their income for food, shelter, etc. (See Table 2 for an estimate of the distribution of personal expenditures). The supermarket from which the employee buys his food spends part of each dollar received from its customers on salaries, wholesale groceries, etc. The wholesale grocer from whom the supermarket buys its supplies spends part of each dollar received on salaries, as payments to farmers, etc. This chain reaction goes on and on, causing the initial expenditures or incomes to be multiplied many times.

A similar multiplying effect exists with regard to the number of jobs created by an employer. First, the employer creates a given number of direct jobs. Then, each employee creates demands for goods and services which in turn create more jobs.

The magnitudes of these multiplier effects in a local economy depend on many factors: the size and economic independence of a region, the proportion of jobs in basic and service industries, the interdependence among various sectors of the economy, the demographic characteristics of the population, patterns of consumer spending, the saving preferences of the communities' residents, etc. The determination of specific multiplier values for a local economy is a complicated task and one that can only be done theoretically rather than empirically.[1]

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[1]cf. A. A. Kubursi and R. H. Frank, "Sectoral. Characteristics of the Ontario Structure of Production," Ontario Economic Review (Toronto, Ontario: Dept. of Treasury & Economics, March 1972 Special Supplement).

After careful consideration of several studies dealing with multipliers, a value of 2.0 was selected for both the income and employment multipliers used in this study.[1] These values are undoubtedly conservative in view of the studies cited. For example, Caffrey and Issacs report an employment multiplier of 2.2 for Los Angeles County (which does not include induced effects). A theoretical income multiplier based on the expenditure patterns reported in Table 2 was approximated by the researcher for the Wentworth County area. That multiplier had a value of 2.1 without including induced effects, which would tend to increase the multiplier.

The multipliers discussed here are applied to McMaster's direct economic impact in the following section.

Applying the Multipliers

Table 9 presents the total economic impact (income and employment) of McMaster by geographical area using the multipliers discussed in the previous section.

Note that $97,000,000 or 68% of the income generated by McMaster accrues to the Wentworth County area. The majority of this is undoubtedly generated within the city of Hamilton. With regard to the employment supported by the University, 84% of the jobs (5370) are held by residents of the Wentworth County area.

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[1]Office of Institutional Research, The Economic Impact of the University of Calgary on the City of Calgary (Calgary, Alberta: University of Calgary, 1971), pp. 4-5; A. A. Kubursi and R. H. Frank, "Sectoral Characteristics of the Ontario Structure of Production," Ontario Economic Review, Special Supplement (Toronto, Ontario: Department of Treasury and Economics, March 1972), pp. 4-6; Educational Systems Research Group, The Impact of the University of Pittsburgh on the Local Economy (Washington, D. C.: Educational Systems Research Group, April 1972), pp. 75-76; John Caffrey and Herbert H. Issacs, Estimating the Impact of a College or University on the Economy (Washington, D. C.: American Council on Education, 1971), pp. 44-45.

TABLE 9:

Total Economic Impact[1]

Area	Total Income Resulting from University[2]	Total Employment Supported by Univ.[3]
Wentworth County-- Including Hamilton	$ 97,000,000	5370
Halton County-- Including Burlington	8,800,000	680
Other Areas	36,500,000	312
Total	$ 142,300,000	6362

Savings to Students from Local Households[4]

This portion of the study examined the savings to students from local households. While these savings do not result in University-related cash flows and therefore were not included in the earlier part of the study, they nevertheless represent a real economic benefit to students living at home. In some cases savings resulting from living at home may make the difference between being able to attend university or being forced to remain out of university.

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[1]Excluding McMaster University Medical Centre (MUMC).

[2]Total Income = Multiplier x Table 7.

[3]Total Employment = multiplier x Table 8. This estimate was confirmed by an alternate method as follows. The University's total non-salary and operating expenditures of $38,375,000 were multiplied by a factor of 70 - 90 indirect jobs per million dollars of expenditures (based on University of Pittsburgh, pg. 76, and Calgary, pg. 12 studies cited earlier). This method produced an estimate of jobs indirectly supported by the University of 2686-3454, or a total number of jobs supported by the University of 5721-6489, which confirmed the figure of 6362.

[4]The savings here relate almost exclusively to undergraduate students since few graduate students live with their families while attending McMaster. Data are limited to the regular academic year (approximately eight months).

"Local" in this context refers to a student living at home whose residence is in the counties of Brant, Haldimand, Halton, Lincoln, and Wentworth (including all urban centres in those counties). The analysis involved a comparison between students who lived at home and students who lived in residence at McMaster. Those who lived both away from home and off-campus were not included since the factors involved in that decision are often personal and not primarily financial. The assumption underlying the analysis was that university-related costs (e.g., fees, room and board, textbooks, etc.) are approximately the same for all major universities in the province. The following table summarizes those costs that differ significantly for a student living at home as opposed to one living in residence at the University. [1]

TABLE 10:

Comparative Costs for Students Living at Home and in Residence at McMaster

Expense Item	Living at Home	Living in Residence
Accommodation	-	1150
Food	400	
Transportation	200[2]	50
Misc. Living Expenses	350	400
Total	$ 950	$ 1600

Thus, the average student living at home saves approximately $650 over his counterpart living in residence at McMaster. Students living close to the University (e.g., Westdale district) would, of course, save somewhat more than this and those living at a distance (e.g., Brantford) would save somewhat less due to the differences in transportation costs.

Approximately 2500 undergraduate students live at home. Therefore, the total savings to local households resulting from students being able to live at home while attending university was of the order of $1,625,000. Thus, if McMaster were not present in the Hamilton area, these students would have to spend an additional $1,625,000 to attend a university elsewhere.

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[1] Data in the table are from the sources referenced in Appendix A.

[2] Based on an average commuting distance of nine miles, costs per mile of $ .07, and 300 trips per year.

APPENDIX A

STUDENT EXPENDITURES BY CATEGORY
(Excluding Expenditures at McMaster)

Student Expenditures by Category (excluding expenditures at McMaster)[1]

Undergraduate Students Living at Home

Food	$ 400
Transportation	450
Misc. Living Expenses	350
Total	$ 1200

Undergraduate Students Living in University Residence

Transportation	$ 50
Misc. Living Expenses	400
Total	$ 450

Undergraduate Students Living Away from Home and Off-Campus

Accommodation	$ 650
Food	600
Transportation	50
Misc. Living Expenses	350
Total	$ 1650

Graduate Students[2]

Accommodation	$ 1400
Food	1200
Clothing	150
Health Insurance	130
Misc. Expenses (incl. Transport)	500
Total	$ 3380

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[1]These data were based on a residence survey of undergraduate students done by the Office of the Dean of Students, estimates made by the Registrar's Office, and a report of graduate student living expenses done for the Ministry of University Affairs by the Office of the Dean of Graduate Studies. Note that two factors contribute to the substantially higher expenditures by graduate students: (1) the majority of them are married, many with children, and (2) their work extends over a full twelve-month year instead of the eight-month year for undergraduates.

[2]All graduate students were treated as living off-campus.

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Inquiries about the study should be addressed to:

Office of Institutional Research
McMaster University
Hamilton, Ontario
L8S 4L8

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